

CLAIMS:

1. A method comprising:
defining a flow specification data type for a routing protocol, wherein the flow specification data type allows a variable number of packet flow attributes to be specified;
generating a message that encodes traffic flow criteria in accordance with the flow specification data type; and
communicating the message to a routing device to direct the routing device to control network traffic based on the traffic flow criteria.
2. The method of claim 1, wherein defining a flow specification data type comprises defining the flow specification data type as information associated with a route advertised by the message.
3. The method of claim 1, wherein defining a flow specification data type comprises defining the flow specification data type as network layer reachability information (NLRI) that is associated with a route advertised by the message.
4. The method of claim 1, wherein defining a flow specification data type comprises defining the flow specification type to include a length field that indicates the number of packet flow attributes specified.
5. The method of claim 1, the flow specification data type including multiple subcomponents, wherein defining a flow specification data type comprises defining each of the subcomponents to include a subcomponent type field and a set of value fields.
6. The method of claim 1, wherein defining a flow specification data type comprises defining a subcomponent for specifying a destination prefix.

7. The method of claim 1, wherein defining a flow specification data type comprises defining subcomponents for specifying a destination prefix, a source prefix, a protocol, a source port, a destination port, an ICMP type, and a packet length.
8. The method of claim 1, wherein the routing protocol is the Border Gateway Protocol (BGP).
9. The method of claim 1, wherein defining a flow specification data type comprises redefining a preexisting data type of the routing protocol to define the flow specification data type.
10. The method of claim 1, wherein defining a flow specification data type comprises defining the flow specification data type as an application-specific data type in accordance with the routing protocol.
11. The method of claim 1, wherein defining a flow specification data type further comprises assigning an application-specific identifier to the flow specification data type to direct the router to install the traffic flow criteria within an independent routing information base (RIB).
12. The method of claim 1, further comprising:
 - assigning an application-specific identifier to the flow specification data type; and
 - configuring a policy to selectively enable distribution of the traffic flow criteria based on the application-specific identifier.
13. The method of claim 12, wherein assigning an application-specific identifier comprises assigning an Address Family Identifier (AFI) and Subsequent Address Family Identifier (SAFI) to the flow specification data type.
14. The method of claim 1, wherein the traffic flow criteria specifies an appropriate action that is performed on the network packet.

15. The method of claim 14, wherein the appropriate action includes one of load balancing, rate limiting, and filtering.
16. A method comprising:
 - receiving a routing communication that encodes traffic flow criteria in accordance with a flow specification data type for a routing protocol, wherein the flow specification data type allows a variable number of packet flow attributes to be specified; and
 - controlling network traffic in accordance with the traffic flow criteria.
17. The method of claim 16, wherein controlling network traffic includes one of load balancing, rate limiting, and filtering the network traffic in accordance with the traffic flow criteria.
18. The method of claim 16, wherein the flow specification data type is defined as information associated with a route advertised by the routing communication.
19. The method of claim 18, wherein the flow specification data type is defined as network layer reachability information (NLRI) that is associated with a route advertised by the message.
20. The method of claim 16, wherein the flow specification data type includes a length field for specifying the number of packet flow attributes specified.
21. The method of claim 16, the flow specification data type including multiple subcomponents, wherein each of the subcomponents includes a subcomponent type field and a set of value fields.
22. The method of claim 16, wherein the traffic flow criteria specifies an appropriate action that is performed on the network packet, wherein the appropriate action includes one of load balancing, rate limiting, and filtering.

23. The method of claim 16, wherein the routing communication further specifies a route to a network destination, the method further comprising:
- comparing the specified route to a routing information base; and
 - rejecting the traffic flow criteria based on the comparison when the route does not specify a preferred path to the network destination.
24. The method of claim 16, wherein receiving a routing communication comprises communicating with a router in accordance with the routing protocol.
25. The method of claim 16, wherein the routing protocol is the Border Gateway Protocol (BGP).
26. The method of claim 16, wherein the flow specification data type is encoded by redefining a preexisting data type of the routing protocol to define the flow specification data type.
27. The method of claim 16, wherein the flow specification data type is defined as an application-specific data type in accordance with the routing protocol.
28. The method of claim 16, wherein an application-specific identifier is assigned to the flow specification data type to direct the receiving router to install the traffic flow criteria within an independent routing information base (RIB).
29. The method of claim 16, wherein an application-specific identifier is assigned to the flow specification data type.
30. The method of claim 29, wherein the application-specific identifier includes an Address Family Identifier (AFI) and Subsequent Address Family Identifier (SAFI).

31. The method of claim 16, further comprising updating a log that includes information about the routing communication.

32. A network device comprising:

a control unit to generate a message that encodes traffic flow criteria in accordance with a flow specification data type, wherein the flow specification data type allows a variable number of packet flow attributes to be specified; and

an interface card to communicate the message to a routing device in accordance with a routing protocol, wherein the message directs the control unit to apply an appropriate action on network traffic based on the traffic flow criteria.

33. The network device of claim 32, wherein the control unit defines the flow specification data type as information associated with a route advertised by the message.

34. The network device of claim 33, wherein the control unit defines the flow specification data type as network layer reachability information (NLRI) that is associated with a route advertised by the message.

35. The network device of claim 32, wherein the control unit defines subcomponents for specifying a destination prefix, a source prefix, a protocol, a source port, a destination port, an ICMP type, and a packet length.

36. The network device of claim 32, wherein the routing protocol is the Border Gateway Protocol (BGP).

37. The network device of claim 32, wherein the control unit redefines a preexisting data type of the routing protocol to define the flow specification data type.

38. The network device of claim 32, wherein the control unit defines the flow specification data type as an application-specific data type in accordance with the routing protocol.

39. A network device comprising:
an interface card to receive routing communication that encodes traffic flow criteria in accordance with a flow specification data type for a routing protocol, wherein the flow specification data type allows a variable number of packet flow attributes to be specified; and
a control unit to compare network traffic to the traffic flow criteria, and apply an appropriate action to the network traffic.
40. The network device of claim 39, wherein the appropriate action includes one of load balancing, rate limiting, and filtering the network traffic in accordance with the traffic flow criteria.
41. The network device of claim 39, wherein the flow specification data type is defined as information associated with a route advertised by the routing communication.
42. The network device of claim 39, wherein the flow specification data type is defined as network layer reachability information (NLRI) that is associated with a route advertised by the message.
43. The network device of claim 39, wherein the routing protocol is the Border Gateway Protocol (BGP).
44. The network device of claim 39, wherein the flow specification data type is defined as an application-specific data type in accordance with the routing protocol.
45. The network device of claim 39, wherein an application-specific identifier is assigned to the flow specification data type, and the control unit install the traffic flow criteria within an independent routing information base (RIB) in response to the application-specific identifier.

46. A system comprising:

a first network device to generate a message that encodes traffic flow criteria in accordance with a flow specification data type, and communicate the message to a second routing device via a routing protocol, wherein the flow specification data type allows a variable number of packet flow attributes to be specified; and

a second network device to receive the message, compare network traffic to the traffic flow criteria, and apply an appropriate action to the network traffic based on the traffic flow criteria.

47. The system of claim 46, wherein the first network device defines the flow specification data type as information associated with a route advertised by the message.

48. The system of claim 46, wherein the first network device defines the flow specification data type as network layer reachability information (NLRI) that is associated with a route advertised by the message.

49. The system of claim 46, wherein the first network device defines subcomponents for specifying a destination prefix, a source prefix, a protocol, a source port, a destination port, an ICMP type, and a packet length.

50. The system of claim 46, wherein the routing protocol is the Border Gateway Protocol (BGP).

51. The system of claim 46, wherein the first network device defines a preexisting data type of the routing protocol to define the flow specification data type.

52. The system of claim 46, wherein the appropriate action includes one of load balancing, rate limiting, and filtering the network traffic in accordance with the traffic flow criteria.

53. The system of claim 46, wherein the flow specification data type is defined as an application-specific data type in accordance with the routing protocol.

54. The system of claim 46, wherein an application-specific identifier is assigned to the flow specification data type.

55. A computer-readable medium comprising instructions for causing a programmable processor to:

define a flow specification data type for a routing protocol, wherein the flow specification data type allows a variable number of packet flow attributes to be specified;

generate a message that encodes traffic flow criteria in accordance with the flow specification data type; and

communicate the message to a routing device to direct the routing device to control network traffic based on the traffic flow criteria.

56. The computer-readable medium of claim 55, wherein defining a flow specification data type comprises defining the flow specification data type as information associated with a route advertised by the message.

57. The computer-readable medium of claim 55, wherein defining a flow specification data type comprises defining the flow specification data type as network layer reachability information (NLRI) that is associated with a route advertised by the message.

58. The computer-readable medium of claim 55, wherein defining a flow specification data type comprises defining subcomponents for specifying a destination prefix, a source prefix, a protocol, a source port, a destination port, an ICMP type, and a packet length.

59. The computer-readable medium of claim 55, wherein the routing protocol is the Border Gateway Protocol (BGP).

60. The computer-readable medium of claim 55, wherein defining a flow specification data type comprises redefining a preexisting data type of the routing protocol to define the flow specification data type.

61. The computer-readable medium of claim 55, wherein defining a flow specification data type comprises defining the flow specification data type as an application-specific data type in accordance with the routing protocol.

62. The computer-readable medium of claim 55, wherein defining a flow specification data type further comprises assigning an application-specific identifier to the flow specification data type to direct the router to install the traffic flow criteria within an independent routing information base (RIB).

63. A computer-readable medium comprising instructions for causing a programmable processor to:

receive a routing communication that encodes traffic flow criteria in accordance with a flow specification data type for a routing protocol, wherein the flow specification data type allows a variable number of packet flow attributes to be specified; and

control network traffic in accordance with the traffic flow criteria.

64. The computer-readable medium of claim 63, further comprising instructions to cause the processor to control network traffic by performing one of load balancing, rate limiting, and filtering the network traffic in accordance with the traffic flow criteria.

65. The computer-readable medium of claim 63, wherein the flow specification data type is defined as information associated with a route advertised by the routing communication.

66. The computer-readable medium of claim 63, wherein the flow specification data type is defined as network layer reachability information (NLRI) that is associated with a route advertised by the message.

67. The computer-readable medium of claim 63, wherein the routing protocol is the Border Gateway Protocol (BGP).

68. The computer-readable medium of claim 63, wherein the flow specification data type is encoded by redefining a preexisting data type of the routing protocol to define the flow specification data type.

69. The computer-readable medium of claim 63, wherein the flow specification data type is defined as an application-specific data type in accordance with the routing protocol.

70. The computer-readable medium of claim 63, wherein an application-specific identifier is assigned to the flow specification data type.